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EXAMINER	
RUSH, ERIC	

ART UNIT	PAPER NUMBER
2624	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	**Application No.** 10/561,256	**Applicant(s)** KOSHIZEN ET AL.	
	Examiner ERIC RUSH	**Art Unit** 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 11 August 2009.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 19-28,30-39,41 and 42 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 19-28,30-39,41 and 42 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 14 December 2005 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This action is responsive to the arguments and remarks filed 11 August 2009.

Claims 19 - 28, 30 - 39, 41 and 42 are currently pending.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (Official Gazette notice of 22 November 2005), Annex IV, reads as follows:

> Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional descriptive material." In this context, "functional descriptive material" consists of data structures and computer programs which impart functionality when employed as a computer component. (The definition of "data structure" is "a physical or logical relationship among data elements, designed to support specific data manipulation functions." The New IEEE Standard Dictionary of Electrical and Electronics Terms 308 (5th ed. 1993).) "Nonfunctional descriptive material" includes but is not limited to music, literary works and a compilation or mere arrangement of data.
>
> When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized. Compare In re Lowry, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994) (claim to data structure stored on a computer readable medium that increases computer efficiency held statutory) and Warmerdam, 33 F.3d at 1360-61, 31 USPQ2d at 1759 (claim to computer having a specific data structure stored in memory held statutory product-by-process claim) with Warmerdam, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure per se held nonstatutory).
>
> In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See Lowry, 32 F.3d at 1583-84, 32 USPQ2d at 1035.

Claims 30 - 39 and 42 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows. Claim 30 defines a "system". However while the preamble defines a "system", which would typically be indicative of an "apparatus", the body of the claim lacks definite structure indicative of a physical apparatus. Furthermore, the specification indicates that the invention may be embodied as pure software, see page 9 paragraph 0005 and page 11 lines 16 - 19 note that the instant specification recites that the modules may be implemented in software. Therefore, the claim as a whole appears to be nothing more than a "system" of software elements, thus defining functional descriptive material per se.

Functional descriptive material may be statutory if it resides on a "computer-readable medium or computer-readable memory". The claim(s) indicated above lack structure and do not define a computer readable medium and are thus non-statutory for that reason (i.e. "When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized" - Guidelines Annex IV). The scope of the presently claimed invention encompasses products that are not necessarily computer readable, and thus NOT able to impart any functionality of the recited program. The Examiner suggests:

a. Amending the claim(s) to embody the program on a "non-transitory computer-readable storage medium" or equivalent.

b. Adding structure to the body of the claim that would clearly define a statutory apparatus.

Any amendment to the claim should be commensurate with its corresponding disclosure.

Note:

A “signal” (or equivalent) embodying functional descriptive material is neither a process nor a product (i.e., a tangible “thing”) and therefore does not fall within one of the four statutory classes of § 101. Rather, “signal” is a form of energy, in the absence of any physical structure or tangible material.

Should the full scope of the claim as properly read in light of the disclosure encompass non-statutory subject matter such as a “signal”, the claim as a whole would be non-statutory. In the case where the specification defines the computer readable medium or memory as statutory tangible products such as a hard drive, ROM, RAM, etc, as well as a non-statutory entity such as a “signal”, “carrier wave”, or “transmission medium”, the examiner suggests amending the claim to *include* the disclosed tangible computer readable media, while at the same time *excluding* the intangible media such as signals, carrier waves, etc.

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 19, 20, 24 - 28, 30, 31, 35 - 39, 41 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bernd Heisele, Purdy Ho, Tomaso Poggio, "Face Recognition with Support Vector Machines: Global versus Component-based Approach", Proceedings 8th International Conference on Computer Vision, Volume 2, pp. 688 – 694, Vancouver 2001, herein referred to as "Heisele et al." in view of Alex Pentland, Baback Moghaddam and Thad Starner, "View-Based and Modular Eigenspaces for Face Recognition" Computer Vision and Pattern Recognition, 1994. Proceedings CVPR '94., 1994 IEEE Computer Society Conference, 21-23 Jun. 1994, Pages 84-91, herein referred to as "Pentland et al." and further in view of Li et al. U.S. Patent No. 7,024,033 B2.

- With regards to claims 30 and 19, Heisele et al. teach a system and a method for recognizing faces of persons, comprising: a training module configured to train a facial component recognition system to recognize a facial component; (Heisele et al., Section 4 "Component-based Approach" Subsection 4.1 "Detection") a population module configured to populate a first knowledge base with facial components and, for each facial component, the facial component's body part classification, wherein the facial components in the first knowledge base include a first set of facial components extracted from facial identification training image data of a face of a first person at a first set of viewpoints; (Heisele et al., Figure 3, Section 4.2, Section 5 Paragraph 1 – Paragraph 2, [Heisele et al. show

outputs of an eye, nose and mouth classifier and discuss that their training data comes from a set of 8,593 facial images of 5 subjects at varying views.]) an indicator component module configured to: determining a first set of body part classifications associated with the first set of facial components; (Heisele et al., Fig. 3, Section 4 "Component-based Approach" Subsection 4.1 “Detection” [Heisele et al. show that the classifiers are labeled to indicate what partial facial component is outputted.]) for each body part classification in the first set of body part classifications: determine, from the first set of facial components, a subset of facial components that are associated with the body part classification. (Heisele et al., Figure 3, Section 4.2, Section 5 Paragraph 1 – Paragraph 2, [Heisele et al. show outputs of an eye, nose and mouth classifier and discuss that their training data comes from a set of 8,593 facial images of 5 subjects at varying views. Therefor multiple facial components exist on each face image and a subset of eyes, noses, mouths, etc.. are classified and outputted accordingly.]) Heisele et al. fail to explicitly teach wherein for each body part classification they determine a probability that a person class of the subset of facial components is the first person; and determine a first body part classification in the first set of body part classifications that maximizes the probability. Pertaining to the same field of endeavor, Pentland et al. teach a training module configured to train a facial component recognition system to recognize a facial component; (Pentland

et al., Abstract, Page 87 Section 4. “Eigenfeatures”, Section 4.1 “detection of Facial Features” and Section 4.2 View-invariant detection” [Pentland et al. teach training a eye, nose and mouth classifiers across a subset of the available views.]) and for each body part classification they determine a probability that a person class of the subset of facial components is the first person; (Pentland et al., Page 87 Column 1 Lines 3 - 18, Page 90 Fig. 7, Page 90 Column 1 Lines 12 - 28) and determine a first body part classification in the first set of body part classifications that maximizes the probability. (Pentland et al., Page 87 Column 1 Lines 3 - 18, Page 90 Fig. 7, Page 90 Column 2 Lines 13 - 33 [Pentland et al. discuss implementing "a more elaborate weighting scheme for classification (e.g., eyes tend to be the most salient features). A more ambitious scheme would be to modulate the contribution of each component..." Also, Pentland et al. teach embedding a facial feature description to perform classification by "embedding this mechanism in the framework of out view-based eigenspace method…", i.e. training the facial feature classification in the same manner described on Page 87 Column 1 Lines 3 - 18 where they take face image across a subset of views.]) Pentland et al. do not explicitly state determining a first body part classification that maximizes the probability. (Pentland et al. do, however, lay the groundwork by teaching a weighting scheme geared towards the most salient features, see Page 90 Column 2 Lines 15 - 23). Pertaining to analogous art, Li et al. teach

determining a first classifier, i.e. a first classification, that maximizes the probability. (Li et al., Fig. 2 Element 206, Column 7 Lines 36 - 51, Column 14 Lines 25 - 50, Column 15 Lines 20 - 44 [Li et al. teach selecting (determining) a single classifier associated with a single feature, column 7 lines 36 - 51, which is associated with the highest confidence that the classifier appropriately determines the class.]) It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Heisele et al. with the teachings of Pentland et al. This modification would have been prompted in order to substitute the singular feature vector of Heisele et al. with the known technique of Pentland et al. This combination would have been prompted by Pentland et al. because they discuss that using the partial components of their invention, or Heisele et al., individually allows for a robust recognition system and would furthermore allow for weights to be distributed to the most salient component, normally, but not always, an eye. This combination could be completed according to known techniques in the art and would likely yield predictable results, in that the combination would contain a hierarchy of weighted classifiers corresponding to the partial facial components of a face image undergoing facial recognition. Furthermore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combined teachings of Heisele et al. in view of Pentland et al. with the teachings of Li et al. This modification would have been prompted

in order to apply the well known technique of a variation of adaboost to the base teachings of Heisele et al. in view of Pentland et al. This combination would be able to determine the most salient classifier, as suggested by Pentland et al. Page 90 Column 2 Lines 15 - 23, so that the highest weight could be associated with the classifier deemed to provide the highest level of recognition confidence, i.e. the highest probability that the classifier is correctly recognizing a person class. This combination could be completed according to known techniques in the art and would likely yield predictable results, in that the combined invention would discriminate the most robust classifier associated with a particular feature for recognition so that the classifier may be associated with the highest weight.

- With regards to claims 31 and 20, Heisele et al. in view of Pentland et al. and further in view of Li et al. teach the system and method of claims 42 and 41, respectively. Heisele et al. fail to explicitly teach wherein the first body part classification and the second body part classification are different. Pentland et al. teach wherein the first body part classification and the second body part classification are different. (Pentland et al., Page 87 Column 1 Lines 3 - 18, Page 90 Fig. 7, Page 90 Column 2 Lines 13 - 33 [Pentland et al. discuss implementing "a more elaborate weighting scheme for classification (e.g., eyes tend to be the most salient features). A more ambitious scheme would be to modulate the contribution of each

component..." Also, Pentland et al. teach embedding a facial feature description to perform classification by "embedding this mechanism in the framework of out view-based eigenspace method…", i.e. training the facial feature classification in the same manner described on Page 87 Column 1 Lines 3 - 18 where they take face image across a subset of views. The Examiner notes that the Pentland et al. merely states that the eyes tend to be most salient, i.e. the eyes are not always the most salient.])

- With regards to claims 35 and 24, Heisele et al. in view of Pentland et al. and further in view of Li et al. teach the system and method of claims 30 and 19, respectively, further comprising a storage module configured to store, in a second knowledge base, the facial components in the first set of facial components that are associated with the first body part classification. (Heisele et al., Abstract, Section 1 Paragraph 1, and Section 5 Paragraph 1, although Heisele et al. is silent to a storage module it is implicit from the discussion of using SVM recognition for every person in a database, as well as the recording of the test set)

- With regards to claims 36 and 25, Heisele et al. in view of Pentland et al. and further in view of Li et al. teach the system and method of claims 35 and 24, respectively, further comprising: a receiving module configured to receive facial components at various viewpoints of a person to be

identified; (Heisele et al., Section 5 Paragraph 1 – Paragraph 2) and an identification module configured to identify the person using a facial component stored in the second knowledge base. (Heisele et al., Section 1 Paragraph 4, Section 4.1, Figures 3 and 4)

- With regards to claims 37 and 26, Heisele et al. in view of Pentland et al. and further in view of Li et al. teach the system and method of claims 42 and 41, respectively, wherein the first set of viewpoints and the second set of viewpoints are different. (Heisele et al., Section 3.1 "Face Detection" , Section 5 Paragraph 1 – Paragraph 2 and Paragraphs 5 - 7) Furthermore, the Examiner notes that Pentland et al. also teach the above limitations. (Pentland et al., Page 87 Column 1 Lines 4 - 18, Page 87 Column 2 Lines 35 - 45)

- With regards to claims 38 and 27, Heisele et al. in view of Pentland et al. and further in view of Li et al. teach the system and method of claims 30 and 19, respectively, wherein the training module is further configured to: receive facial component training image data of faces of persons at various viewpoints; (Heisele et al., Section 3.1 "Face Detection", Section 5 Paragraphs 1 - 2) extract facial components at various viewpoints from the facial component training image data of faces of persons at various viewpoints; (Heisele et al., Section 4.1 – 4.2) and train a body part

classifier module using the extracted facial components. (Heisele et al., Section 4.2 Section 5 Paragraphs 1 - 2) Furthermore, the Examiner notes that Pentland et al. also teach the above limitations. (Pentland et al., Page 87 Column 1 Lines 4 - 18, Page 87 Column 2 Lines 35 - 45)

- With regards to claims 39 and 28, Heisele et al. in view of Pentland et al. and further in view of Li et al. teach the system and method of claims 38 and 27, respectively, wherein the body part classifier module performs one-versus-all classification. (Heisele et al., Section 4.2 and Section 5 Paragraphs 1 - 2)

- With regards to claims 42 and 41, Heisele et al. in view of Pentland et al. and further in view of Li et al. teach the system and method of claims 30 and 19, respectively, wherein the facial components in the first knowledge base further include a second set of facial components extracted from facial identification training image data of a face of a second person at a second set of viewpoints, (Heisele et al., Figure 3, Section 4.2, Section 5 Paragraph 1 – Paragraph 2, [Heisele et al. show outputs of an eye, nose and mouth classifier and discuss that their training data comes from a set of 8,593 facial images of 5 subjects at varying views.]) and wherein the indicator component module is further configured to: determine a second set of body part classifications associated with the second set of facial

components; (Heisele et al., Fig. 3, Section 4 "Component-based Approach" Subsection 4.1 “Detection” [Heisele et al. show that the classifiers are labeled to indicate what partial facial component is outputted.]) for each body part classification in the second set of body part classifications: determine, from the second set of facial components, a subset of facial components that are associated with the body part classification. (Heisele et al., Figure 3, Section 4.2, Section 5 Paragraph 1 – Paragraph 2, [Heisele et al. show outputs of an eye, nose and mouth classifier and discuss that their training data comes from a set of 8,593 facial images of 5 subjects at varying views. Therefor multiple facial components exist on each face image and a subset of eyes, noses, mouths, etc.. are classified and outputted accordingly.]) Heisele et al. fail to explicitly teach determine a probability that a person class of the subset of facial components is the second person; and determine a second body part classification in the second set of body part classifications that maximize the probability. Pertaining to the same field of endeavor, Pentland et al. teach wherein the facial components in the first knowledge base further include a second set of facial components extracted from facial identification training image data of a face of a second person at a second set of viewpoints, (Pentland et al., Page 87 Column 1 Lines 3 - 18, Page 87 Column 2 Lines 43 - 48, Page 90 Fig. 7, Page 90 Column 1 Lines 12 - 28 [Pentland et al. like Heisele et al. teach training data of individuals

across a plurality of viewpoints.] determine a probability that a person class of the subset of facial components is the second person; (Pentland et al., Page 87 Column 1 Lines 3 - 18, Page 90 Fig. 7, Page 90 Column 1 Lines 12 - 28) and determine a second body part classification in the second set of body part classifications that maximize the probability. (Pentland et al., Page 87 Column 1 Lines 3 - 18, Page 90 Fig. 7, Page 90 Column 2 Lines 13 - 33 [Pentland et al. discuss implementing "a more elaborate weighting scheme for classification (e.g., eyes tend to be the most salient features). A more ambitious scheme would be to modulate the contribution of each component..." Also, Pentland et al. teach embedding a facial feature description to perform classification by "embedding this mechanism in the framework of out view-based eigenspace method…", i.e. training the facial feature classification in the same manner described on Page 87 Column 1 Lines 3 - 18 where they take face image across a subset of views. The Examiner notes that the Pentland et al. merely states that the eyes tend to be most salient, i.e. the eyes are not always the most salient.]) Pentland et al. do not explicitly state determining a first body part classification that maximizes the probability. (Pentland et al. do, however, lay the groundwork by teaching a weighting scheme geared towards the most salient features, see Page 90 Column 2 Lines 15 - 23). Pertaining to analogous art, Li et al. teach determining a first classifier, i.e. a first classification, that maximizes the

probability. (Li et al., Fig. 2 Element 206, Column 7 Lines 36 - 51, Column 14 Lines 25 - 50, Column 15 Lines 20 - 44 [Li et al. teach selecting (determining) a single classifier associated with a single feature, column 7 lines 36 - 51, which is associated with the highest confidence that the classifier appropriately determines the class.])

5. Claims 21, 22, 32 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bernd Heisele, Purdy Ho, Tomaso Poggio, "Face Recognition with Support Vector Machines: Global versus Component-based Approach", Proceedings 8th International Conference on Computer Vision, Volume 2, pp. 688 – 694, Vancouver 2001, herein referred to as "Heisele et al." in view of Alex Pentland, Baback Moghaddam and Thad Starner, "View-Based and Modular Eigenspaces for Face Recognition" Computer Vision and Pattern Recognition, 1994. Proceedings CVPR '94., 1994 IEEE Computer Society Conference, 21-23 Jun. 1994, Pages 84-91, herein referred to as "Pentland et al." and further in view of Li et al. U.S. Patent No. 7,024,033 B2 as applied to claims 19 and 30 above, and further in view of Ralph Gross, Jie Yang and Alex Waibel, "Growing Gaussian Mixture Models for Pose Invariant Face Recognition" Pattern Recognition, 2000. Proceedings. 15th International Conference on vol. 1, 3-7 Sept. 2000 Pages 1088-1091, herein referred to as "Gross et al.".

- With regards to claims 32 and 21, Heisele et al. in view of Pentland et al. and further in view of Li et al. teach the system and method of claims 30

and 19, respectively. Heisele et al. fail to explicitly teach wherein the indicator component module is further configured to determine the probability using Bayesian estimation. Pertaining to the same field of endeavor, Gross et al. teach wherein the indicator component module is further configured to determine the probability using Bayesian estimation. (Gross et al., Page 1089 Section 3.2 “Pose Invariant Face Recognition” and Pages 1089 - 1090 Section 3.3 "Growing Gaussian Mixture Models" [Gross et al. teach when given a face image x and class Ck using Bayes' rule to link posterior probability to the class conditional probability for each mixture component ‘j’, which for the combined invention is each partial face component.]) It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combined teachings of Heisele et al. in view of Pentland and further in view of Li et al. with the teachings of Gross et al. This modification would have been prompted in order to utilize the well known technique of Bayes' rule to the base invention of Heisele et al. in view of Pentland et al. and Li et al. This would have also been prompted to increase the robustness of Pentland et al. in the same way as demonstrated by Gross et al. and as suggested by Gross et al., Page 1089 Column 2 Lines 1 - 11 and Lines 23 - 32. This combination would benefit from the teachings in the same way Gross et al. describe the advantage, in order to “train the system with a short sequence of images…” and to utilize unrestricted head poses, see Gross

et al. Abstract and Page 1089 Section 3.2 “Pose Invariant Face Recognition Paragraph 4. This combination could be completed according known techniques and would likely yield predictable results, in that the combined system would benefit from a training system adapted to multiple unrestricted views. Furthermore, this added component is shown to increase the robustness of the overall system as shown by Gross et al., Abstract.

- With regards to claims 33 and 22, Heisele et al. in view of Pentland et al. and further in view of Li et al. teach the system and method of claims 30 and 19, respectively. Heisele et al. fail to explicitly teach wherein determining the probability that the person class of the subset of facial components is the first person comprises: determining a first conditional probability, that a class is the first person, of a facial component of the subset of facial components at a first viewpoint; determining a first posterior probability, that a class is the first person, by multiplying the conditional probability at the first viewpoint by a prior probability, that a class is the first person; determining a second conditional probability, that a class is the first person, of a facial component of the subset of facial components at an additional viewpoint; and determining a second posterior probability, that a class is the first person, by multiplying the second conditional probability by the first posterior probability. Pertaining

to the same field of endeavor, Gross et al. teach wherein determining the probability that the person class of the subset of facial components is the first person comprises: determining a first conditional probability, that a class is the first person, of a facial component of the subset of facial components at a first viewpoint; (Gross et al., Page 1089 Section 3.2 “Pose Invariant Face Recognition” and Pages 1089 - 1090 Section 3.3 "Growing Gaussian Mixture Models" [Gross et al. teach when given a face image x and class Ck using Bayes' rule to link posterior probability to the class conditional probability for each mixture component ‘j’, which for the combined invention is each partial face component. Furthermore, Gross et al. state that their system does the aforementioned procedure for each face image and each image comes from a variety of "unrestricted" viewpoints., Page 1089 Column 1 Lines 15 - 20]) determining a first posterior probability, that a class is the first person, by multiplying the conditional probability at the first viewpoint by a prior probability, that a class is the first person; (Gross et al., Page 1089 Section 3.2 “Pose Invariant Face Recognition” and Pages 1089 - 1090 Section 3.3 "Growing Gaussian Mixture Models") determining a second conditional probability, that a class is the first person, of a facial component of the subset of facial components at an additional viewpoint; (Gross et al., Page 1089 Section 3.2 “Pose Invariant Face Recognition” and Pages 1089 - 1090 Section 3.3 "Growing Gaussian Mixture Models") and determining a second posterior

probability, that a class is the first person, by multiplying the second conditional probability by the first posterior probability. (Gross et al., Page 1089 Section 3.2 “Pose Invariant Face Recognition” and Pages 1089 - 1090 Section 3.3 "Growing Gaussian Mixture Models") It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combined teachings of Heisele et al. in view of Pentland and further in view of Li et al. with the teachings of Gross et al. This modification would have been prompted in order to utilize the well known technique of Bayes' rule to the base invention of Heisele et al. in view of Pentland et al. and Li et al. This would have also been prompted to increase the robustness of Pentland et al. in the same way as demonstrated by Gross et al. and as suggested by Gross et al., Page 1089 Column 2 Lines 1 - 11 and Lines 23 - 32. This combination would benefit from the teachings in the same way Gross et al. describe the advantage, in order to “train the system with a short sequence of images…” and to utilize unrestricted head poses, see Gross et al. Abstract and Page 1089 Section 3.2 “Pose Invariant Face Recognition Paragraph 4. This combination could be completed according known techniques and would likely yield predictable results, in that the combined system would benefit from a training system adapted to multiple unrestricted views. Furthermore, this added component is shown to increase the robustness of the overall system as shown by Gross et al., Abstract.

6. Claims 23 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bernd Heisele, Purdy Ho, Tomaso Poggio, “Face Recognition with Support Vector Machines: Global versus Component-based Approach”, Proceedings 8th International Conference on Computer Vision, Volume 2, pp. 688 – 694, Vancouver 2001, herein referred to as “Heisele et al." in view of Alex Pentland, Baback Moghaddam and Thad Starner, “View-Based and Modular Eigenspaces for Face Recognition” Computer Vision and Pattern Recognition, 1994. Proceedings CVPR '94.,1994 IEEE Computer Society Conference, 21-23 Jun. 1994, Pages 84-91, herein referred to as “Pentland et al.” and further in view of Li et al. U.S. Patent No. 7,024,033 B2 further in view of Ralph Gross, Jie Yang and Alex Waibel, “Growing Gaussian Mixture Models for Pose Invariant Face Recognition" Pattern Recognition, 2000. Proceedings. 15th International Conference on vol. 1, 3-7 Sept. 2000 Pages 1088-1091, herein referred to as “Gross et al.” as applied to claims 22 and 33 above, and further in view of Paul Viola, Michael J. Jones, “Robust Real-time Object Detection”, Cambridge Research Laboratory, Cambridge, Massachusetts, February 2001, Pages 1 - 25 as applied to claims 19 and 30 above, and further in view of Paul Viola, “Complex Feature Recognition: A Bayesian Approach for Learning to Recognize Objects," AI Memo No. 1591, Artificial Intelligence Laboratory, MIT, Cambridge, MA, November 1996, herein referred to as “Paul et al.”.

- With regards to claims 34 and 23, Heisele et al. in view of Pentland et al. further in view of Li et al. and further in view of Gross et al. teach the

system and method of claims 33 and 22, respectively. Heisele et al. fail to explicitly teach wherein the prior probability, that the class is the first person, comprises one Nth where N is a number of person classes. Pentland et al. teach Bayes' rule. (Pentland et al., Pages 1089 - 1090 Section 3.3 "Growing Gaussian Mixture Models) Pentland et al. fail to explicitly show wherein the prior probability, that the class is the first person, comprises one Nth where N is a number of person classes. Pertaining to the same field of endeavor, Paul et al. teach wherein the prior probability, that the class is the first person, comprises one Nth where N is a number of person classes. (Paul et al., Page 2 Section 2 “A Generative Process for Images” Paragraphs 3 - 5, Page 10 Lines 1 - 24 Equations 12 - 17) It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combined teachings of Heisele et al. in view of Pentland et al. further in view of Li et al. and further in view of Gross et al. with the teachings of Paul et al. This modification would have been prompted because prior probability being 1/N when there are N classes (or states) is an extremely well known component of Bayes' theorem. This modification would allow for appropriate conditional and posterior probabilities to be determined and aid in weighting the classifiers and probabilities accordingly. This combination could be completed using well known techniques in the art and would likely yield predictable results, in that Bayes' theorem would be

utilized to its full extent and the conditional and/or posterior probabilities of a feature belonging to a specific class (or state) can be appropriate computed.

Response to Arguments

7. Applicant's arguments with respect to claims 19 and 30 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Zhang et al. U.S. Patent No. 6,671,391; which is directed to pose-adaptive face detection.
- Satonaka et al. U.S. Patent No. 6,236,749; which is directed to face recognition using a plurality of features per face and adaptively training a system to classify a person belong to a set of features under varying pose conditions.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ERIC RUSH whose telephone number is (571)270-3017. The examiner can normally be reached on 7:30AM - 5:00PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (571) 272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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